

WHAT IS CLAIMED IS:

- 1 1. A method for a thermo-electric cooler coupled to a laser diode, the
2 method comprising:
 - 3 operating the thermo-electric cooler in one of at least a low power mode and a
4 standard mode, the laser diode configured to transmit signals in the low
5 power mode and the standard mode; and
6 switching between the low power mode and the standard mode, wherein:
 - 7 the low power mode maintains a laser diode at a temperature within a
8 predetermined range of temperatures; and
9 the standard mode maintains the laser diode at a temperature that
10 corresponds to a predetermined wavelength of light output from
11 the laser diode.
- 1 2. The method of claim 1 wherein the low power mode is a Time
2 Division Multiplexing (TDM) mode.
- 1 3. The method of claim 1 wherein the standard mode is a Dense
2 Wavelength Division Multiplexing (DWDM) mode.
- 1 4. The method of claim 1 further comprising:
 - 2 operating the thermo-electric cooler in a quasi-standard mode, the laser diode
3 configured to transmit signals in the quasi-standard power mode.
- 1 5. The method of claim 1 wherein laser diode is configured in an OC-192
2 transceiver line card disposed in a synchronous optical network (SONET)
3 communication system.
- 1 6. The method of claim 1 wherein the predetermined range of
2 temperatures is a range of temperatures within which the laser diode has a user-
3 defined power versus performance ratio.
- 1 7. The method of claim 1 wherein the predetermined range of
2 temperatures are input by one of a user and a system generated source.

1 8. The method of claim 1 wherein the predetermined range of
2 temperatures is determined by a user setting a temperature measure above and below
3 a fixed temperature that corresponds to a wavelength of light output from the laser
4 diode.

1 9. An apparatus comprising:
2 means for operating a thermo-electric cooler coupled to a laser diode in one of
3 a low power mode and a standard mode; and
4 means for switching between the low power mode and the standard mode,
5 wherein the low power mode maintains the laser diode at a temperature
6 within a predetermined range of temperatures and the standard mode
7 maintains the laser diode at a temperature that corresponds to a
8 predetermined wavelength of light output from the laser diode.

1 10. The apparatus of claim 9 wherein the predetermined range of
2 temperatures is determined by a user setting a temperature measure above and below
3 a fixed temperature that corresponds to a wavelength of light output from the laser
4 diode.

1 11. The apparatus of claim 9 wherein the low power mode is a Time
2 Division Multiplexing (TDM) mode.

1 12. The apparatus of claim 9 wherein the standard mode is a Dense
2 Wavelength Division Multiplexing (DWDM) mode.

1 13. The apparatus of claim 9 wherein laser diode is configured in an OC-
2 192 transceiver line card disposed in a synchronous optical network (SONET)
3 communication system.

1 14. An optical transceiver comprising:
2 a temperature circuit;
3 a thermo-electric cooler coupled to the temperature circuit; and

4 a laser diode coupled to the thermo-electric cooler, wherein the thermo-
5 electric cooler is responsive to inputs from the temperature circuit, the
6 inputs identifying one of at least a first mode and a second mode,
7 wherein a choice of mode is a function of a performance requirement.

1 15. The optical transceiver of claim 14 wherein the performance
2 requirement is one of the first mode, wherein the first mode is a standard mode for
3 dense wavelength division multiplexing (DWDM) applications, and the second mode,
4 wherein the second mode is a low-power mode for time domain multiplexing (TDM)
5 applications.

1 16. The optical transceiver of claim 14, further comprising:
2 a temperature circuit, the temperature circuit including a switch configured to
3 alter the thermo-electric cooler between the first mode and the second
4 mode.

1 17. The optical transceiver of claim 14 wherein the second mode is a dense
2 wavelength division multiplexing (DWDM) mode and the first mode is a time-
3 division multiplexed (TDM) mode.

1 18. The optical transceiver of claim 14 further comprising:
2 a coupler coupled to the laser diode, the lens producing an optical signal; and
3 an optical fiber coupled to the coupler; and
4 a wavelength signal circuit coupled to the coupler and the temperature circuit,
5 the wavelength signal circuit configured to transmit feedback to the
6 temperature circuit to maintain a stable wavelength of the laser diode.

1 19. The optical transceiver of claim 14 wherein the optical transceiver is
2 disposed on an OC-192 transceiver line card of a synchronous optical network
3 (SONET) communication system.

1 20. The optical transceiver of claim 14 wherein the first mode is a low-
2 power mode and the second mode is a standard mode, the first mode configured to
3 permit a predetermined amount of wavelength drift.

1 21. The optical transceiver of claim 14 wherein the first mode is a low-
2 power mode in which the thermo-electric cooler dissipates less than 5 Watts under
3 normal operating conditions.

1 22. The optical transceiver of claim 14 wherein the low power mode
2 permits wavelength drift within operable parameters.

1 23. A method for providing thermo-electric cooled system for operating a
2 laser diode comprising:
3 operating a laser diode in one of a first mode and a second mode wherein the
4 choice of mode is a function of a user-defined power and performance
5 ratio.

1 24. The method of claim 23 wherein the function is a ratio of power versus
2 performance wherein the power required to cool a laser diode is compared with the
3 performance required for one of a plurality of laser diode applications.

1 25. The method of claim 24 wherein the plurality of laser diode
2 applications include time division multiplexing (TDM), dense wavelength division
3 multiplexing (DWDM) and wavelength division multiplexing (WDM) applications.